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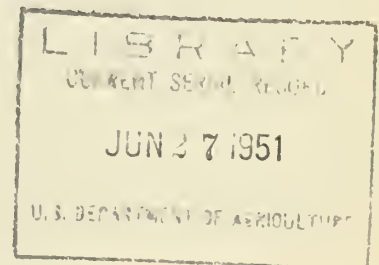
United States Department of Agriculture
Agricultural Research Administration
Bureau of Plant Industry, Soils,
and Agricultural Engineering

H. T. & S. Office Report No. 248

✓ Storage Tests with Prepackaged McFarlin
and Late Howes Cranberries, 1950-1951. ✓

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Report of a study made under the
Research and Marketing Act of 1946
Project No. 275

May 28, 1951
New York, New York

Storage Tests with Prepackaged McFarlin and Late Howes Cranberries. 1950-1951.

Storage tests were conducted with prepackaged cranberries of the 1950 crop because of the interest of some of the western growers in determining the practicability of storing the McFarlin variety in their apple storage rooms which are maintained at a temperature range of 30°-31° F.

Previous tests with Early Black and Late Howes ^{1/} have shown that physiological breakdown is an important cause of deterioration in stored prepackaged cranberries, particularly when they are held at temperatures near 32° F. Although the McFarlin has the reputation among the trade of being a "poor keeper" it was believed worthwhile to determine whether this might be the result of decay and whether this variety might be less subject to physiological breakdown at low temperatures than are other varieties. Late Howes were used for comparative purposes.

Materials and Methods

Since it was not feasible to work with western-grown berries, Massachusetts-grown McFarlin and Late Howes packaged in unsealed 1-pound window boxes were used in the tests. The window boxes were packaged commercially and were packed in 2^{1/2}-pound size corrugated cardboard cartons. Four storage temperatures, 31°, 33°, 36°, and 38° F. were used. The berries were received at the New York City Market Pathology Laboratory on November 3, 1950. At that time the cartons were unpacked, and the consumer packages randomized in the cartons. After an initial inspection of 6 boxes of each variety, the cartons were placed immediately in cold storage. Six window boxes of each variety were inspected from each temperature at the end of 4, 8, and 12 weeks' storage, and four boxes were inspected at the end of 16 weeks.

Prior to storage and when removed from storage half of the packages were opened and inspected immediately and half were held for one week at 65° F., to simulate retail store conditions.

Inspections were made by removing 100 berries at random from the package, cutting each berry, and examining them for evidence of either decay or physiological breakdown.

The results of the storage test are summarized in table 1.

1/ Hruschka, H. W., and Kaufman, J. Storage of prepackaged cranberries. Pre-Pack-Age 3(2): October, 1949.

Hruschka, H. W., and Kaufman, J. Storage tests with prepackaged cranberries. U.S. Dept. Agr., Bur. Plant Industry, Soils, and Agricultural Engineering R. T. & S. Office Report No. 235, 3 p., 1951. (Processed).

Results with Late Howes

Inspected at the time of removal from storage

Decay increased slowly with increasing length of storage, until it ranged from 2 to 5 percent in those stored as long as 16 weeks.

Practically no physiological breakdown was found in the berries stored only four or eight weeks. In those stored twelve weeks it was important in the 31° F. lots (4.3 percent) and for those stored 16 weeks it was present in serious amounts at 31° F. (8 percent) and in considerable amounts at 33° F. (4.5 percent).

Total spoilage exceeded 5 percent in the lots stored at 31° F. for twelve weeks and in all lots stored sixteen weeks.

Inspected after holding 1 week at 65° F.

Physiological breakdown was important in the berries held a week at 65° F. following eight weeks' storage at 31° F. (3 percent), whereas it was of little importance at time of removal from cold storage. It was more serious in the lots stored 12 and 16 weeks at 31° F. It also seriously affected the berries stored sixteen weeks at 33° F. (9.5 percent).

On the basis of total spoilage found at the end of the one-week holding period following removal from cold storage there was no apparent advantage in storing Late Howes at temperatures as low as 31° or 33° F., or in holding them at either 36° or 38° F. longer than 8 or 12 weeks.

Results with McFarlin

Inspected at the time of removal from storage

Decay, as determined at the time the cranberries were removed from storage, did not develop seriously at any temperature even during a sixteen-week storage period. Thus, with two exceptions, less than 5 percent decay was noted in any of the lots at the time the packages were removed from storage even though 2.5 percent decay was observed in this variety at the time the packages were stored.

Physiological breakdown was seriously present in the berries stored for eight weeks or longer at either 31° or 33° F. and was of some importance in those stored twelve weeks or longer at 36° F. This was reflected in the high figures for total spoilage in the same lots.

Of the lots held at 36° and 38° F. total spoilage was serious in those stored 8 weeks or longer.

Inspected after holding 1 week at 65° F.

Total spoilage of the McFarlin became so serious during the one-week holding period following removal from storage that it is questionable whether

storage can be considered to have been successful at any of the temperatures tested. Certainly the two lower temperatures can be dismissed from further consideration. With regard to storage at 36° or 38° the results were not uniform inasmuch as more decay was found in those stored only four weeks than in those stored eight weeks. This was undoubtedly due to the higher temperature (70° rather than 65°) prevailing while the four-weeks lots were in the holding room. The best that can be said for storage of McFarlin in the present test is that they did not hold up well (during the one-week period) when stored for longer than 4 or 8 weeks at either 36° or 38° F.

Discussion

The amounts of spoilage found during the course of this test confirm the statements frequently made by members of the trade concerning the poor keeping quality of McFarlin cranberries. Physiological breakdown was the major form of deterioration noted in this variety and it was particularly important in those packages stored at 31° for longer than 4 weeks. The increase in the amount of physiological breakdown that occurred in both varieties during the one-week holding period following removal from storage is considered to represent injury that was actually caused by exposure to low temperatures during the storage period, but that became visible or was "unmasked" as a result of holding the berries for a week at the higher temperature. Decay was also important, especially at the end of the one-week holding period following removal from storage.

Less decay and much less physiological breakdown was found in Late Howes than in McFarlin. In many instances total spoilage was only one-fourth as great in Late Howes as in the McFarlin variety.

The results indicate the advisability of marketing prepackaged McFarlin cranberries rapidly and for holding them at 36° or 38° whenever storage becomes necessary. The amount of physiological breakdown resulting from storage at low temperatures shows that storage temperatures commonly used for apples are entirely unsatisfactory for the storage of prepackaged McFarlin cranberries.

The results of the present test also show that temperatures of 31° and 33° F. are too low for the storage of prepackaged Late Howes. When stored at 36° or 38° prepackaged Late Howes held up fairly satisfactory for 8 to 12 weeks.

Table 1. Results of storing prepackaged cranberries, 1950-51.

Length of Storage Period	Temperature ° F.	Variety	Inspection at time of removal from storage			Inspection after holding 1 wk. at 65 °F. following removal from storage		
			Decay %	Physio- logical Break- down %	Total Spoilage %	Decay %	Physio- logical Break- down %	Total Spoilage %
At start, prior to storage		LH	0.5	0	0.5	3.0	0	3.0
4 weeks	31 °	LH	1.7	0	1.7	2.7	0	2.7
	33 °	LH	1.0	0	1.0	4.0	0	4.0
	36 °	LH	1.0	0.3	1.3	5.7	0	5.7
	38 °	LH	0.7	0	0.7	5.0	0	5.0
8 weeks	31 °	LH	0.7	0	0.7	5.3	3.0	8.3
	33 °	LH	0.7	0.3	1.0	1.7	0	1.7
	36 °	LH	1.3	0.3	1.6	3.7	0	3.7
	38 °	LH	3.7	0	3.7	6.0	0	6.0
12 weeks	31 °	LH	2.0	4.3	6.3	2.0	6.7	8.7
	33 °	LH	0.3	1.0	1.3	2.7	1.3	4.0
	36 °	LH	2.3	1.0	3.3	3.3	2.0	5.3
	38 °	LH	1.3	0.7	2.0	5.0	0.3	5.3
16 weeks	31 °	LH	2.0	8.0	10.0	4.5	23.0	27.5
	33 °	LH	3.0	4.5	7.5	4.0	9.5	13.5
	36 °	LH	5.0	0	5.0	8.5	1.0	9.5
	38 °	LH	4.5	1.0	5.5	5.0	0.5	5.5
At start, prior to storage		Mc	2.5	0	2.5	7.5	0	7.5
4 weeks	31 °	Mc	2.3	1.3	3.6	10.3	6.0	16.3
	33 °	Mc	2.0	2.0	4.0	12.7	4.3	17.0
	36 °	Mc	1.0	1.0	2.0	12.0	1.7	13.7
	38 °	Mc	3.3	1.3	4.6	9.3	1.3	10.6
8 weeks	31 °	Mc	1.0	12.0	13.0	4.7	16.0	20.7
	33 °	Mc	2.3	11.3	13.6	4.3	9.0	13.3
	36 °	Mc	3.3	5.0	8.3	3.7	3.7	7.4
	38 °	Mc	5.0	2.3	7.3	4.7	1.7	6.4
12 weeks	31 °	Mc	2.7	25.7	28.4	4.7	27.7	32.4
	33 °	Mc	3.3	7.7	11.0	5.7	13.3	19.0
	36 °	Mc	4.0	7.7	11.7	8.7	5.3	14.0
	38 °	Mc	5.3	3.0	8.3	10.0	5.0	15.0
16 weeks	31 °	Mc	3.0	44.5	47.5	4.5	52.5	57.0
	33 °	Mc	2.5	20.0	22.5	6.5	22.0	28.5
	36 °	Mc	5.0	10.0	15.0	8.5	11.0	19.5
	38 °	Mc	4.0	4.5	8.5	11.0	8.0	19.0

(See page 5 for footnotes 1, 2 and 3)

- 1/ Each figure is an average based on three 100-berry samples representing three consumer packages; for 16 weeks storage the average is based on two samples.
- 2/ LH = Late Howes; Mc = McFarlin
- 3/ 70° F. for samples taken at start of storage and at 4 weeks.

